

**SOLID AND HAZARDOUS WASTE MANAGEMENT SECTION
MEETING REPORT**

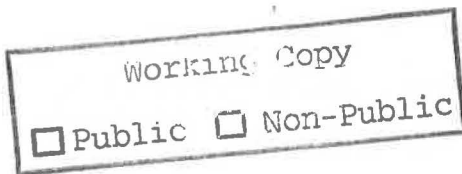
Prepared by: Melissa Ferree

MAF 3/3/15

Meeting Date and Location: January 22, 2015;
DNREC R&R Building, OTS Conference Room

ATTENDANCE:

Melissa A. Ferree, Engineer III, SHWMS
Nancy C. Marker, Program Administrator, SHWMS
Marjorie Crofts, Director, WHS
Kara Coats, Deputy Secretary, DNREC
David Small, Secretary, DNREC
David Ormond, Deputy Attorney General, DOJ
Michele Corash, Counsel for Bloom, Morrison & Foerster
Josh Richman, VP of Business Development, Bloom Energy
David Barber, VP of Human Resources, Bloom Energy
Bryan Horsey, Public Relations Manager, Bloom Energy



PURPOSE:

Discussion of Desulfurization Canisters

REFERENCE:

Bloom Energy; DEN201500008; File Code: 13

BACKGROUND:

On December 9, 2014, the SHWMS issued a letter to Bloom regarding the regulatory status of used desulfurization canisters generated in Bloom's fuel cell modules. The letter concluded that the canisters did not qualify for the manufacturing process unit exemption found in Delaware's *Regulations Governing Hazardous Waste* (DRGHW) § 261.4(c). The letter further stated that the contaminated media met the definition of a spent material and should be managed as hazardous waste.

Bloom representatives initially stated that they concurred with the SHWMS' findings and would fully comply with DRGHW. Bloom did, however, request a meeting to discuss why they believed the exemption applied and to discuss any potential enforcement action.

DISCUSSION:

Bloom began the meeting by providing an overview of the company. Approximately 250 people are employed at two manufacturing facilities in Newark and both facilities are nearly zero-waste facilities. Bloom Energy has servers (fuel cell modules) installed in 11 states.

Mr. Barber then explained that Bloom immediately acted to come into compliance with the requirements of the SHWMS' December 9, 2014 letter. Bloom then hired a qualified, third-party expert (Ms. Corash) to evaluate the regulatory status of the desulfurization canisters.

Ms. Corash stated that she was hired to "get to the right answer" and that responses previously provided to the Department in a series of information request letters were "imprecise, incomplete, or wrong." She also indicated that Mr. Ghezavat, Bloom's EHS Director, did not write them thinking in the context of RCRA and that he should have sent them to another party for evaluation.

Ms. Corash further explained that the canisters are built for life, are valuable and tough, have structural integrity, and in 9 years, have never leaked. She then described how the desulfurization canister works. There is one desulfurization canister in each fuel cell module. The natural gas enters the fuel cell module and first goes through a desulfurization canister to remove sulfur (a component of mercaptan), which poisons the fuel cell. Sulfur, in addition to small amounts of benzene, is caught by the filter media in the canister. As the filter becomes less efficient, the canister is removed and sent to Unicat in Texas to be opened and the filters removed. The filter media is comprised of approximately 35% copper. Once the copper is reclaimed, the remaining waste media is managed as hazardous waste. Based on limited data, approximately half of Bloom's analytical data on the waste media demonstrates it is hazardous for benzene (D018), while the other half of the data reflects the waste is non-hazardous. As such, Bloom manages all of the waste removed and not recovered from the desulfurization canisters at Unicat as hazardous waste.

Ms. Corash then explained that the empty canisters are sent back to the Bloom manufacturing facility in Newark to be refilled with filter media purchased from Unicat. She then, however, contradicted herself and stated that this process is not yet in place at the Newark facility, as the site's air permit has not yet been modified to allow this activity.

Since the SHWMS' letter of December 9, 2014, Bloom has been managing the used desulfurization canisters as hazardous waste at each of its Delaware locations. Ms. Corash stated that the used filter media is shipped from Delaware to Unicat or VLS Recovery Services.

Ms. Corash further stated that once they immediately came in to compliance with DRGHW, Bloom representatives began to re-evaluate the regulatory status of the used desulfurization canisters. Upon that review, Bloom continues to believe the manufacturing process unit (MPU) exemption applies. Further, if the MPU exemption does not apply, Bloom believes the contaminated media meets the definition of a byproduct in Table 1 of DRGHW § 261.2, rather than the definition of spent material.

Manufacturing Process Unit Exemption

Ms. Corash stated that the MPU exemption applies, as electricity manufacturing is occurring and desulfurization is integral to electricity production. She further shared the manufacturing process unit exemption continues to apply, as long as waste does not remain in the canister for more than 90 days. Ms. Corash stated that Bloom has never exceeded that 90 day threshold. Ms. Coats asked if there were records to demonstrate that claim, to which Ms. Corash responded in the negative.

To support the Bloom claim that the desulfurization canisters are MPU's, Ms. Corash then provided examples of different pieces of industrial equipment that are mentioned in the preamble to the federal rule promulgating the manufacturing process unit exemption (45 FR 72024), including flotation units, distillation columns, and cooling water towers. She described the filtering process conducted in the desulfurization canisters as being similar to the separation processes occurring in each of these devices. She then stated that the preamble does not address whether the waste has to be removed on-site or if it can be removed from the MPU at a central, off-site location.

Ms. Ferree stated that there is guidance from EPA regarding heat exchangers being removed from a process and sent off-site. In that instance, EPA concluded that if the heat exchanger is removed from the manufacturing process and is sent to an off-site location, the MPU exemption no longer applied. Ms. Corash countered that this guidance does not apply, as EPA stated equipment that is "disassembled" does not qualify for the MPU exemption, as there would be a loss of structural integrity and therefore the potential for a release of hazardous waste. She further stated that a heat exchanger is not an intact, structurally sound unit and thus, a release of hazardous waste is possible if the heat exchanger is shipped

off-site. She provided photographs of heat exchanger bundles to demonstrate her belief that heat exchangers are not a structurally intact container. She did not, however, provide a photograph of an actual heat exchanger, but rather a photograph of the bundles removed from the exterior shell of the heat exchanger. Ms. Corash then stated that Bloom's desulfurization canisters are not "disassembled," are structurally sound, with no potential for a hazardous waste release. As such, Ms. Corash concluded the referenced guidance is not applicable to the desulfurization canisters, despite EPA's reference to a heat exchanger, not the removed interior bundles.

Ms. Corash further stated that EPA has allowed intact MPUs to be shipped off-site under the MPU exemption. When asked by Department representatives if she had any documentation to support her statement, she stated that she did not have any, but would try to find documentation to provide to the Department.

Department representatives asked if the desulfurization canisters removed all the benzene in the incoming natural gas or if only a portion of the benzene was captured, and in the circumstance wherein only a portion was captured, what happens to the remaining benzene. Ms. Corash responded that the desulfurization canister does not remove all of the benzene; it is only designed to remove sulfur, but collects small amounts of benzene as it passes through the filter. She then stated what happened to the remaining benzene was "magic," for there are no emissions of benzene from the system.

Byproduct

Ms. Corash stated that she understood other states had informally viewed the contaminated media in the desulfurization canister as a byproduct, rather than a spent material. She then stated that at least Ohio had informally made such a statement.

Ms. Corash also claimed that the used desulfurization media does not meet the definition of spent because it is removed long before it can no longer capture sulfur. Her reasoning is based on the fact that Bloom's process has such high standards that the removed media could continue to collect sulfur, though not at the efficiencies required by Bloom. She then clarified that they remove the canister early and it is her (Bloom's) opinion that it is therefore not considered spent.

Ms. Coats asked if Bloom would consider the media a spent material if it stayed in the process long enough that the media could no longer effectively capture any sulfur, to which Ms. Corash responded in the affirmative.

Regulatory Conclusion

Ms. Corash stated that under either scenario, the material is not regulated until it is removed from the canister. She further stated that EPA did not intend to regulate waste until there was a potential for exposure.

Penalty Discussion

Ms. Corash stated that even if the Department concludes that Bloom was incorrect in its original interpretation that the MPU exemption applied, there are seven reasons that this is a situation where potential enforcement action is not warranted:

1. The views in the SHWMS' December 9, 2014 letter were new – there was no reason for Bloom to anticipate them.

2. There is no need – Bloom immediately complied and then came in to talk to the Department about potential options.
3. The canisters posed no risk to the environment, the public, or employees. They cannot be opened without following the instructions in a large manual.
4. There is no economic benefit to Bloom for making the incorrect determination – either way, the materials would ultimately be managed hazardous waste.
5. If there was a violation, the extent of the violation was small. The regulation is not irrelevant, but it was not a substantial deviation from requirements.
6. The regulatory determination is not self-evident – both DNREC and Bloom have taken a long time to think about this.
7. A public action would do damage to Bloom and its customers' image. Bloom sells an environmentally protective energy source. Environmental compliance is a part of their business. Ms. Corash stated that Bloom has never had an environmental violation and they don't want their customers to become hazardous waste generators.

Follow-up Questions/Concerns:

1. Mr. Ormond asked if a cooling tower shipped off-site with hazardous waste in it meets the MPU exemption. Ms. Corash responded in the affirmative. Mr. Ormond asked her to provide documentation to support that conclusion.
2. Ms. Ferree stated that even if the MPU exemption applies, it only exempts the waste from hazardous waste regulation. It remains a solid waste and Bloom indicated in its coastal zone permit application that no solid waste is generated.
3. Ms. Ferree inquired as to why Bloom originally stated that only two (2) canisters required off-site shipment under a temporary EPA ID number, yet Bloom applied for four (4) temporary EPA ID numbers, with two (2) of those sites being large quantity generators. Ms. Corash stated they would look into and get back to us.

CONCLUSION:

Bloom will provide its regulatory interpretation in writing to the Department no later than the morning of Monday, February 23, 2015. In its response, Bloom will also address any outstanding questions from the meeting and will also provide specific corrections to the information request letter responses that Ms. Corash stated to be inaccurate. Additionally, a site visit was scheduled for February 18, 2015 to tour the manufacturing facility and discuss waste management practices.